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56TH CONGRESS, } HOUSE OF REPRESENTATIVES. } DOCUMENT
1st Session. } No. 348.

EXAMINATION AND SURVEY OF WAUKEGAN HARBOR,
ILLINOIS.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS OF
EXAMINATION AND SURVEY OF WAUKEGAN HARBOR, ILLI-
NOIS.

JANUARY 26, 1900.—Referred to the Committee on Rivers and Harbors and ordered
to be printed.

WAR DEPARTMENT,
Washington, January 25, 1900.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated January 24, 1900, together with copies of reports from Capt. J. G. Warren, Corps of Engineers, dated April 18, 1899, and January 5, 1900, the former of a preliminary examination and the latter of a survey of Waukegan Harbor, Illinois, made by him in compliance with the provisions of the river and harbor act of March 3, 1899.

Very respectfully,

ELIHU ROOT,
Secretary of War.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, January 24, 1900.

SIR: I have the honor to submit the accompanying copies of reports dated April 18, 1899, and January 5, 1900, with map, by Capt. J. G. Warren, Corps of Engineers, upon preliminary examination and survey, respectively, of Waukegan Harbor, Illinois, with a view to obtaining a channel 300 feet wide and 20 feet deep, made in pursuance of requirements of the river and harbor act of March 3, 1899.

Captain Warren states that to obtain a channel 300 feet wide and 20 feet deep will necessitate the construction of a new north pier parallel to the present pier, the extension of the south pier, and the construc-

tion of a breakwater, all to be located as shown by broken red lines on the accompanying map, the estimated cost, including dredging, repairs to present piers, etc., being \$395,000; but for the reasons stated by him he believes that the main object sought, viz, to obtain a harbor having a depth of 20 feet, accessible to and commodious enough for the largest class of vessels engaged in the commerce of the Great Lakes, can be attained at less cost by maintaining the entrance channel at its present width of 235 feet, which is deemed sufficient for the requirements of commerce.

The plan of improvement presented, therefore, proposes the extension of the present north pier 1,000 feet, the extension of the south pier 1,400 feet, the construction of a breakwater 600 feet long, and the construction of a pile dock, all as shown by full red lines on the map; the cost of this work, including the protection of outer end of south pier, and southerly end of breakwater by suitable bulkheads, the removal of a portion of present north pier and of a triangular area in front of proposed dock, the reconstruction of a portion of the south pier, repair of both piers, and the dredging in the harbor and basin to a depth of 20 feet below datum being estimated at \$345,000.

The harbor is considered by the local officer to be worthy of improvement by the United States, and his views are concurred in by the division engineer, Col. J. W. Barlow, Corps of Engineers.

Very respectfully, your obedient servant,

JOHN M. WILSON,
Brig. Gen., Chief of Engineers,
U. S. Army.

Hon. ELIHU ROOT,
Secretary of War.

**PRELIMINARY EXAMINATION OF WAUKEGAN HARBOR, ILLINOIS,
WITH A VIEW TO OBTAINING A CHANNEL 300 FEET WIDE AND 20
FEET DEEP.**

UNITED STATES ENGINEER OFFICE,
Milwaukee, Wis., April 18, 1899.

GENERAL: I have the honor to submit the following report upon a preliminary examination made in pursuance of letters dated Office of the Chief of Engineers, United States Army, March 15, 1899, and April 15, 1899, to comply with item in section 22, river and harbor act of March 3, 1899, as follows: "Waukegan Harbor, Illinois: With a view to obtaining a channel three hundred feet wide and twenty feet deep."

Waukegan is situated on the west shore of Lake Michigan, 35 miles north of Chicago and 50 miles south of Milwaukee. Population in 1890, about 5,000.

The project for the improvement of this harbor, adopted in 1880, with subsequent modifications, provided for the formation of an entrance channel and interior basin 13 feet deep. The piers were completed in 1895 and the dredging in 1896.

The city authorities have built some 600 linear feet of dock, and have now under contract, and nearly completed, a channel 16 feet deep and 60 feet wide from Lake Michigan, between the Government piers, to the basin; thence to the northern end of the basin the width is to be 120 feet.

From the north end or head of the basin the Western Coal and Dock Company of Chicago have obtained the dock privileges fronting on the south side of Slip No. 1, and have erected extensive coal sheds adjacent thereto, planned for, and already nearly equipped with, modern appliances for the rapid handling of coal.

The Peavy Elevator Company, who now have large elevators at South Chicago, have obtained the dock privileges pertaining to Slip No. 2; this slip is not yet completed. These parties have dredged a channel some 1,200 feet long, docked one slip 800 feet long and dredged it to a depth of 18 feet, and propose to complete one or more additional slips at an early day.

Waukegan is provided with railroad facilities leading north and south, and is the northern terminus of the Elgin, Joliet and Eastern Railway, commonly known as the Chicago Outer Belt Line; its eastern terminus is Porter, Ind., and it makes direct connection with every railway entering Chicago.

The construction of the harbor piers has caused the shore line on the north side to advance about 650 feet and on the south side about 150 feet.

Soundings taken in Lake Michigan on lines in prolongation of the piers for a distance of 500 feet from the pierheads indicate that considerable shoaling has taken place and caused material changes in the lake bottom since the survey was made in 1879.

The present depth of water will only admit of light-draft vessels; consequently commerce is small and local in character. It is believed that if the depth was increased to 20 feet the commerce would rapidly increase and become of general benefit to a large section of territory; that it would also relieve to a considerable extent the congested condition of Chicago Harbor, in like manner as South Chicago Harbor now does.

There having been no general survey since 1879, the great advance of the north shore line and changes in the lake bottom in advance of the pierheads render a resurvey necessary, and the probable rapid increase in commerce if the depth of harbor is increased to 20 feet would justify an enlargement of the project. A survey is recommended, to prepare a plan and estimate for improvement, at an estimated cost of \$500.

Very respectfully, your obedient servant,

J. G. WARREN,
Captain, Corps of Engineers.

Brig. Gen. JOHN M. WILSON,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, NORTHWEST DIVISION,
New York, April 24, 1899.

Respectfully forwarded to the Chief of Engineers, United States Army, concurring in the views of the district engineer that the enlargement of the project would result in an increased amount of commerce. I therefore recommend that a survey be made.

J. W. BARLOW,
Colonel, Corps of Engineers,
Division Engineer.

WAUKEGAN HARBOR, ILLINOIS.

[Second indorsement.]

OFFICE CHIEF OF ENGINEERS,
U. S. ARMY,
August 14, 1899.

Respectfully submitted to the Secretary of War.

In accordance with the provisions of the river and harbor act of March 3, 1899, a preliminary examination has been made of Waukegan Harbor, Illinois, "with a view to obtaining a channel three hundred feet wide and twenty feet deep."

The district and division engineers recommend that a survey be made in order to prepare a plan and estimate for improvement, and in view of the statements made in the within report this recommendation is concurred in by me.

A. MACKENZIE,
Acting Chief of Engineers.

[Third indorsement.]

WAR DEPARTMENT,
August 24, 1899.

Approved.

ELIHU ROOT,
Secretary of War.

**SURVEY OF WAUKEGAN HARBOR, ILLINOIS, WITH A VIEW TO
OBTAINING A CHANNEL 300 FEET WIDE AND 20 FEET DEEP.**

UNITED STATES ENGINEER OFFICE,
Milwaukee, Wis., January 5, 1900.

GENERAL: I have the honor to submit the following report of a survey and estimate of cost of improvement of Waukegan Harbor, with a view to obtaining a channel three hundred feet wide and twenty feet deep, in accordance with the requirements of section 22, river and harbor act, approved March 3, 1899, together with a map of the survey.

The harbor of Waukegan, Ill., is situated on the western shore of Lake Michigan, about 85 miles north of Chicago and about 50 miles south of Milwaukee. The present harbor is entirely artificial, it not being located at the mouth of a river. The Waukegan River, which empties into Lake Michigan just south of the harbor, is a comparatively insignificant stream, and of no importance or utility for harbor purposes. The only feature favorable for the construction of a harbor is the low ground between the shore line and the bluff, and which is composed of sand and other material easily removed by dredging.

The earliest project for improvement of this harbor was adopted in 1852, and was for a breakwater parallel to the shore. One crib, 30 by 25 feet, was placed in position, but was carried away, and the work was then abandoned.

A definite plan for the construction for a harbor was adopted in 1880, modified in 1882 and again in 1896. The present project, as finally modified, provides for a channel 13 feet deep below the datum plane of harbor improvements, between parallel piers about 235 feet apart, together with a basin having the same depth and a width of 300 feet, and extending north to the northerly boundary line of United States

require immediate renewal above the water surface. It is believed that the pile dock can be built at a cost no greater, and possibly less, than the cost of renewing the pier. The additional cost of enlarging the basin would therefore be the cost of dredging, and which is estimated at \$17,000.

The estimated cost of the improvement is as follows:

Extending north pier 1,000 feet and south pier 1,400 feet, by cribs 100 feet by 24 feet by 22½ feet on pile foundation, 2,400 linear feet, at \$70.....	\$168,000
Breakwater, 6 cribs, each 100 feet by 30 feet by 25½ feet on pile foundation, 600 linear feet, at \$105.....	63,000
Bulkheads for protecting outer end of south pier and southerly end of breakwater.....	1,000
770 linear feet piledock, at \$12.....	9,240
Removing portion of north pier, 935 feet pile pier, at \$5.....	4,675
Rebuilding 1,000 linear feet superstructure of south pier, at \$10.....	10,000
Repairing portions of present piers.....	2,000
333½ cords stone for refilling piers, at \$6.....	2,000
Dredging 362,000 cubic yards, at 15 cents.....	54,300
Contingencies, superintendence, inspection, etc.....	30,785
Total.....	345,000

This estimate is based on present prices for material and labor, as determined by the latest bids received for doing similar work. The price of dredging is placed at 15 cents to cover the cost of dredging hardpan, a certain percentage of which will probably be encountered.

It is therefore estimated that by maintaining the present width of entrance of 235 feet, the main purpose of the proposed improvement can be secured at a saving of \$50,000.

It is believed that the present width of 235 feet is and will be sufficient for the requirements of commerce, and that the benefits to be derived from increasing the width 65 feet would not be worth the additional \$50,000.

With the exception of Menominee Harbor, none of the harbors in this district have so great a width of entrance as 300 feet. The widths of entrance to the most important harbors in this district are as follows: Kenosha, 250 feet; Racine, 250 feet; Milwaukee, 284 feet and least width between piers of 260 feet; Sheboygan, 275 feet; Manitowoc, 290 feet.

While the width of entrance to Waukegan Harbor is less than any of the foregoing, it is nevertheless believed that it is sufficient, protected as the entrance will be by a breakwater.

It is therefore recommended that the present width of entrance be not increased, and that the extension to the piers and location of the breakwater be as shown by full red lines on the accompanying map.

Since the completion of the 18-foot channel by the United States extensive improvements have been made to the harbor by the city of Waukegan and by the Elgin, Joliet and Eastern Railway Company.

The entrance channel, basin, and adjacent slip have been dredged by the city of Waukegan and by the Elgin, Joliet and Eastern Railway Company, so as to afford a narrow but navigable channel having a depth of 17 feet below datum, thus making the harbor accessible to vessels engaged in the coal-carrying trade; the projected depth of 13 feet, maintained by the United States, being entirely inadequate for the requirements of the growing commerce of this port.

In accordance with the terms of a lease from the Secretary of War to the city of Waukegan dated September 4, 1897, and granting to the

property. The piers were completed in 1895, and the dredging in channel and basin in 1897.

To obtain a channel 300 feet wide and 20 feet deep it will be necessary to build a new north pier parallel to the present pier, to extend the south pier, and to construct a breakwater, all to be located as shown on the accompanying map. The estimated cost of this work, together with the dredging, necessary repairs to present piers, etc., is \$395,000.

It is believed, however, that the main object sought, viz, to obtain a harbor having a depth of 20 feet, and that shall be accessible to and sufficiently commodious for the largest class of vessels engaged in the commerce of the Great Lakes, can be attained at a less cost by the adoption of the following plan:

The north pier to be extended 1,000 feet and the south pier 1,400 feet by timber cribs, each 100 feet by 24 feet by 22½ feet, placed on pile foundation, filled with stone and riprapped.

A breakwater 600 feet long to be built, the proposed location of which is shown on accompanying map. The breakwater to consist of six cribs, each 100 feet by 30 feet by 25½ feet, on a pile foundation, filled and-riprapped with stone.

The outer end of the south pier and the southerly end of the breakwater to be protected by suitable bulkheads.

All that portion of the present north pier along the east side of the basin and as far out as the angle, a total distance of about 935 feet, to be removed, and a pile dock to be built on the line shown on map.

Rebuilding about 1,000 feet of the inner and older portion of the south pier above the water surface, making necessary repairs to the remaining portions of both piers, and refilling them with stone where necessary.

Dredging in the harbor and basin to a depth of 20 feet below datum.

The proposed general plan of harbor entrance is similar to the plans adopted for Racine and Kenosha harbors, at both of which a project for a channel 21 feet deep is now in course of completion. It is believed that by extending the piers and locating the breakwater as proposed, and as indicated on the map, disturbances in the basin by reason of storms from either northeasterly or southeasterly quarters will be prevented, and that safe entrance to the harbor can be had at all times. Experience indicates that whenever harbors in this district are deepened to 20 or 21 feet, storms from a northeasterly direction produce serious disturbances, not only in the harbor entrance but for a considerable distance beyond, causing much dock front that should be available at all times to be useless during a gale from that quarter. Whenever, in other projects for deepening and enlarging the harbors along the western shore of Lake Michigan, a breakwater has not been included in the original project for such enlargement, it has been found necessary to subsequently modify the project to the extent of providing for a breakwater. It is therefore considered best to include the construction of the breakwater in the original project for the 20-foot channel.

Many complaints having been made of the difficulty of turning large vessels from the entrance channel into the basin, it is proposed to increase the area of the basin by dredging the triangular portion lying between the present north pier and the line of the proposed dock to a depth of 20 feet. The greater part of that portion of the north pier to be removed is in a decayed and dilapidated condition, and would

city of Waukegan the use of a portion of the Government land, a description of which is given in Annual Report of Chief of Engineers for 1897, page 270, the city of Waukegan has built a pile dock along the westerly harbor line, extending southerly for a distance of about 567 feet. The Elgin, Joliet and Eastern Railway Company have constructed the slip shown on the accompanying map, and it is understood to be the intention of the company to construct another slip similar to the present one in the near future.

The Western Coal and Dock Company, of Chicago, Ill., have obtained the dock privileges fronting on the south side of Slip No. 1, and have erected extensive coal sheds adjacent thereto, equipped with modern appliances for the rapid handling of coal.

It is understood that the Peavy Elevator Company, who now have large elevators at South Chicago, have obtained the dock privileges pertaining to Slip No. 2, the slip yet to be constructed.

Waukegan is provided with railroad facilities leading north and south, and is the northern terminus of the Elgin, Joliet and Eastern Railway, commonly known as the "Chicago Outer Belt Line," and which makes direct connection with every railway entering Chicago.

It is believed that if the channel depth be increased to 20 feet as proposed it would greatly increase the commerce of the port and be of general benefit to a large section of country. It would also relieve the congested condition of Chicago Harbor to a considerable extent, in a similar manner to South Chicago Harbor.

The harbor is considered worthy of the proposed improvement by the United States.

Very respectfully, your obedient servant,

J. G. WARREN,
Captain, Corps of Engineers.

Brig. Gen. JOHN M. WILSON,
Chief of Engineers, U. S. A.
(Through the Division Engineer.)

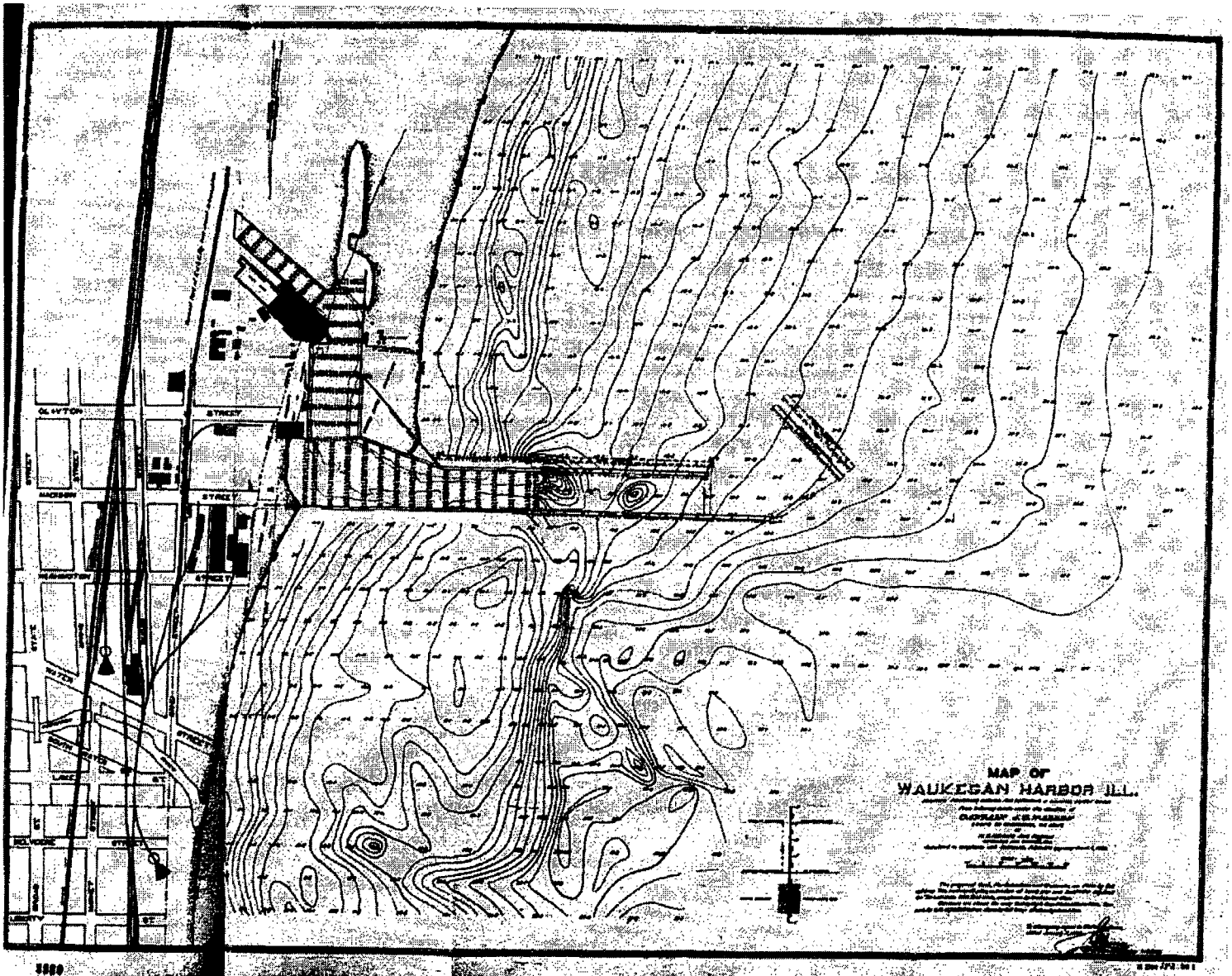
[First Indorsement.]

U. S. ENGINEER OFFICE, NORTHWEST DIVISION,
New York, January 10, 1900.

Respectfully forwarded to the Chief of Engineers, United States Army, concurring in the views of the district engineer.

J. W. BARLOW,
Colonel, Corps of Engineers,
Division Engineer.

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MAP OF
WAUKEGAN HARBOR ILL.

Prepared by the U.S. Coast and Geodetic Survey
under the authority of
ROBERT J. JOHNSON
Chief of the Survey
and published by the
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